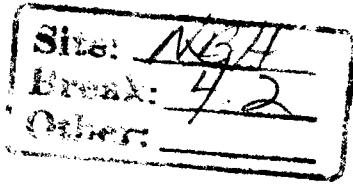


APPENDIX I



NEW BEDFORD HARBOR PILOT STUDY
PRE-OPERATIONAL MONITORING - PROGRESS REPORT:

SDMS DocID 000200374



Current Meter Studies at the Coggeshall St. Bridge

During July 1987

Gregory Tracey
Timothy Gleason

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Introduction

As part of the New Bedford Harbor Pilot Project, current meter measurements were undertaken at the Coggeshall St. Bridge on three dates during the pre-operational sampling period (7/7-7/13/87). The purpose of these measurements was to provide data to the Corps of Engineers in their effort to estimate the flux of dissolved and particulate phase PCB's out of the upper harbor as a result of dredging and dike construction.

Methods

Current meter measurements were made on three dates, 7/8, 7/9 and 7/13/87. The latter two dates corresponded with water sampling for chemical analyses. A Niel Brown direct reading current meter (DRCM) was acquired from SAIC- Newport for this study. The meter was an acoustic-type device. As part of the current speed determination, water temperature, conductivity and salinity are measured for correction of sound velocity information. A deck unit interfaced with the DRCM provided digital readout of these variables. The DRCM was suspended by a hydrowire and lowered by a gas-powered winch. A data cable was also attached and payed out separately.

Three sampling depths at two positions on the bridge were monitored. Total water depth was determined from the difference of (bridge to harbor bottom) - (bridge to water surface). The selected sampling depths were 0.6 meters above bottom, 0.6 meters below water surface, and at one-half the total water

depth. The total tidal excursion was approximately 2.0 meters. The two sampling positions on the bridge, designated 'E' for East and 'W' for West were located approximately 14 and 12 meters from their respective shores. The sampling sites were separated by about 10 meters. Sampling took place at one hour intervals beginning one hour after slack tide for the duration of one flood and one ebb cycle. As the time between slack high and slack low water is approximately six hours, 10 sampling periods per day were undertaken.

Results

Figure 1 depicts the approximate sampling locations in the channel under the bridge. Figures 2-7 summarize the data collected on 8 July 1987. Figures 8-14 summarize the data collected on 9 July 1987. Figures 15-21 summarize the data collected on 13 July 1987. In general, current speed ranged from 10-50 cm/sec. Some differences were observed between East and West sampling locations in regards to current speed and salinity, but further data is required to more fully characterize these differences. Temperature varied between 22 to 24 degrees Celcius and was relatively uniform over the three days. Salinity was more variable, and on 9 July 1987 varied from 24-29 ppt. between slack low and slack high tide. These changes may be related either to low level fresh water input or from offshore waters intruding up the harbor. In general, little variation in current speed, temperature or salinity was observed over depth for any given sampling period.

Discussion

It is clear from the data and the lack of consistent tidally related pattern that the hydrography of the area is highly complex. However, this was our first attempt to characterize the dynamics of this system, and further data sets at later dates will undoubtedly facilitate a greater understanding of the hydrography.

Figure 1. Profile of the channel bottom under the Coggeshall St. bridge and approximate sampling locations.

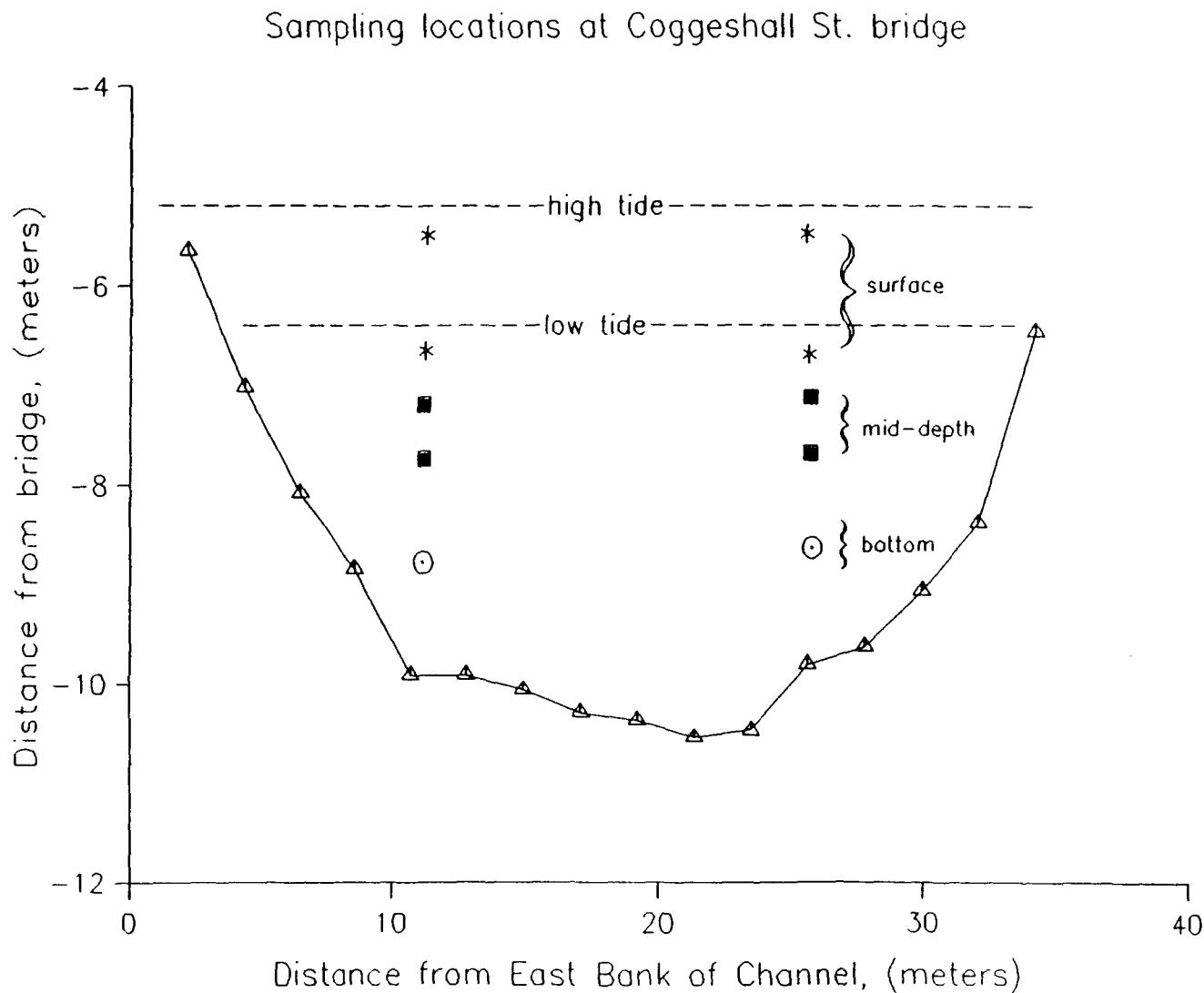


Figure 2. Water depth in the Coggeshall St. bridge channel vs. time on 8 July 1987 (870708).

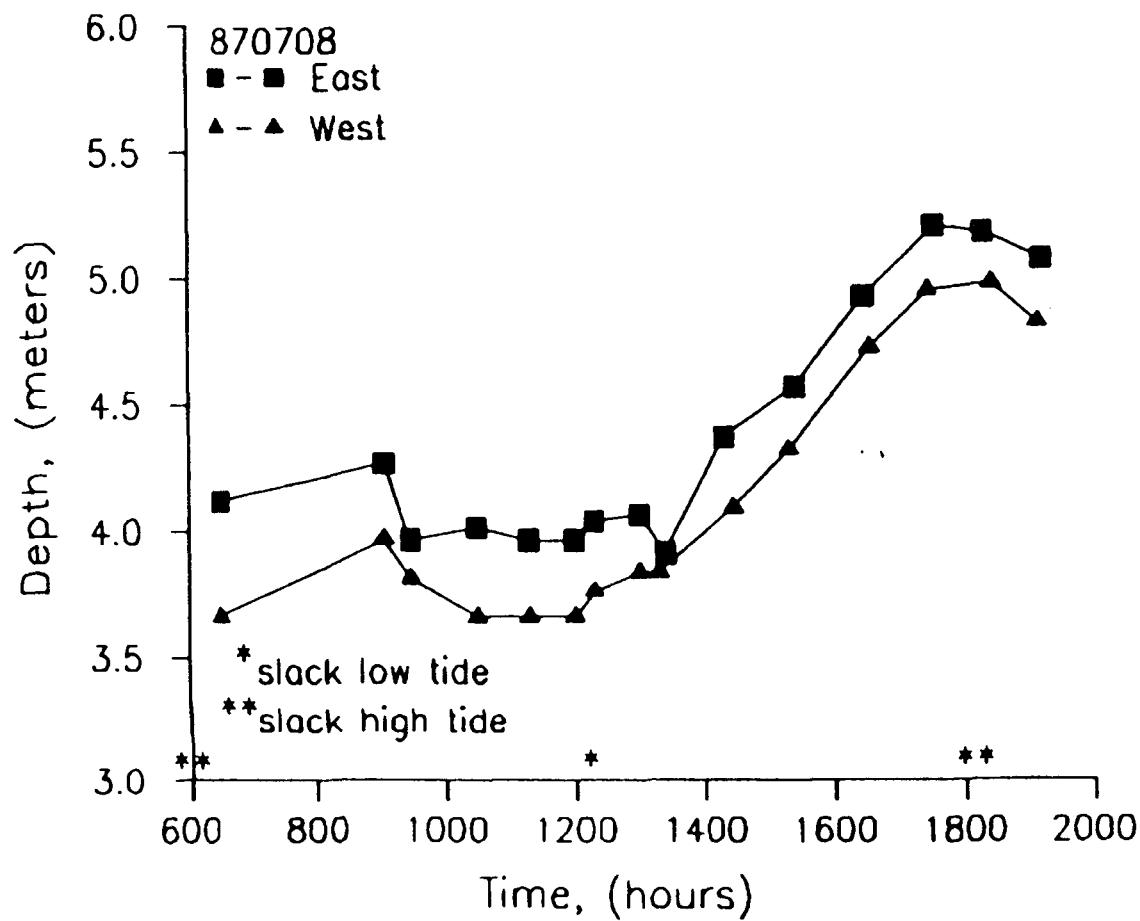


Figure 3. Comparisons of mean current speed (averaged over depth) vs. time for East and West sampling locations during the ebb and flood tides of 8 July 1987.

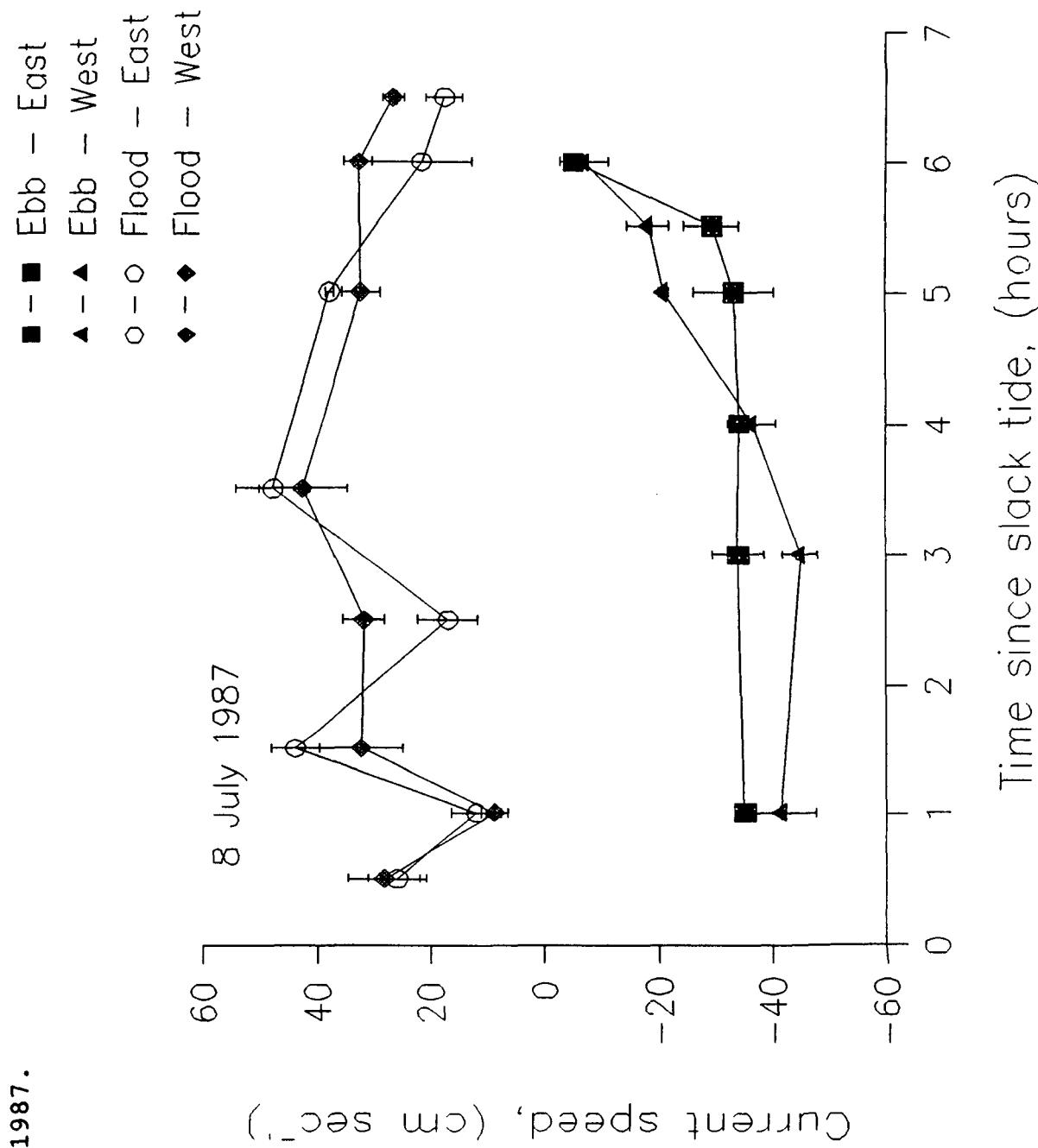


Figure 4. Comparisons of temperature vs. time for East and West sampling locations during the flood tide of 8 July 1987.

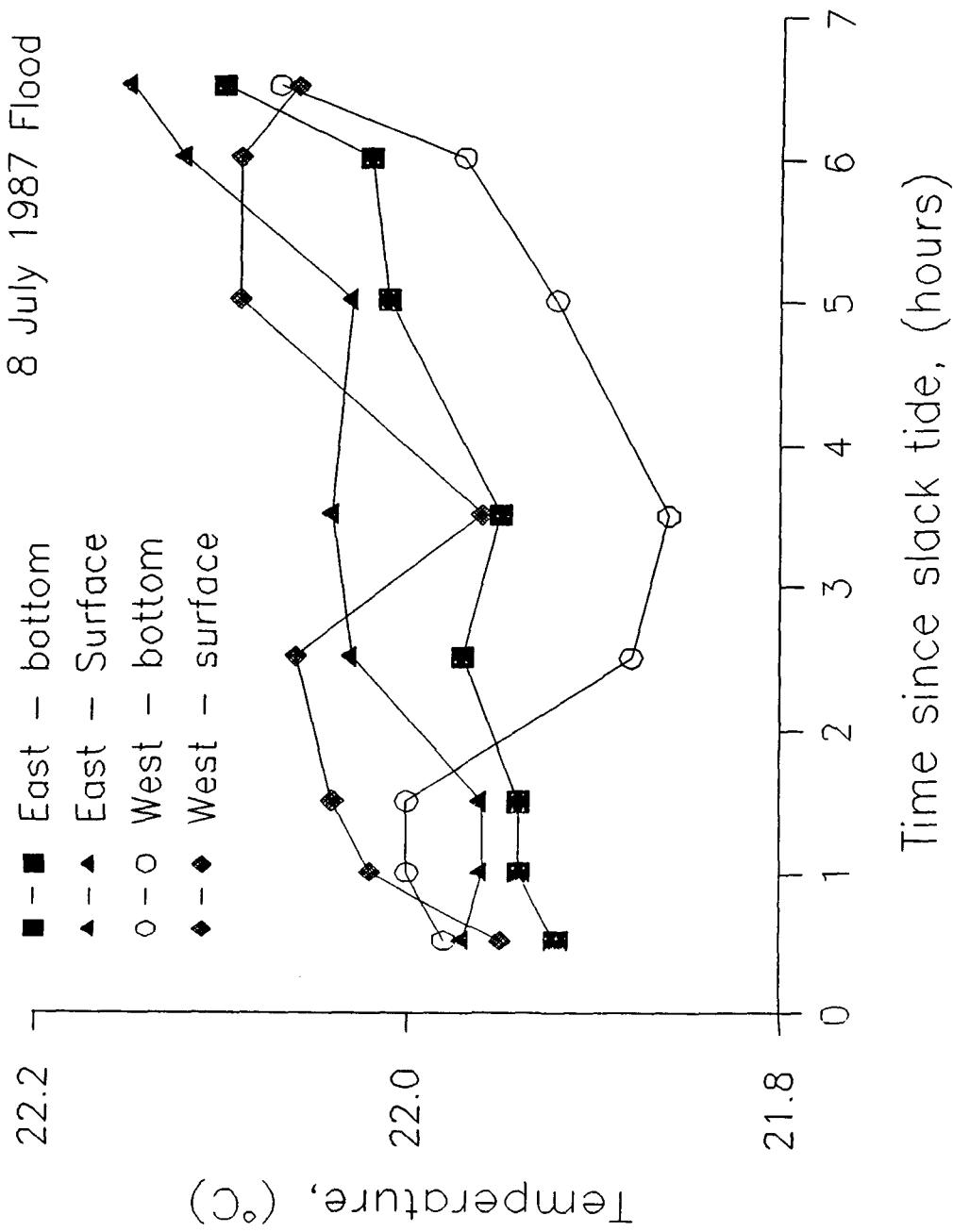


Figure 5. Comparisons of temperature vs. time for East and West sampling locations during the ebb tide of 8 July 1987.

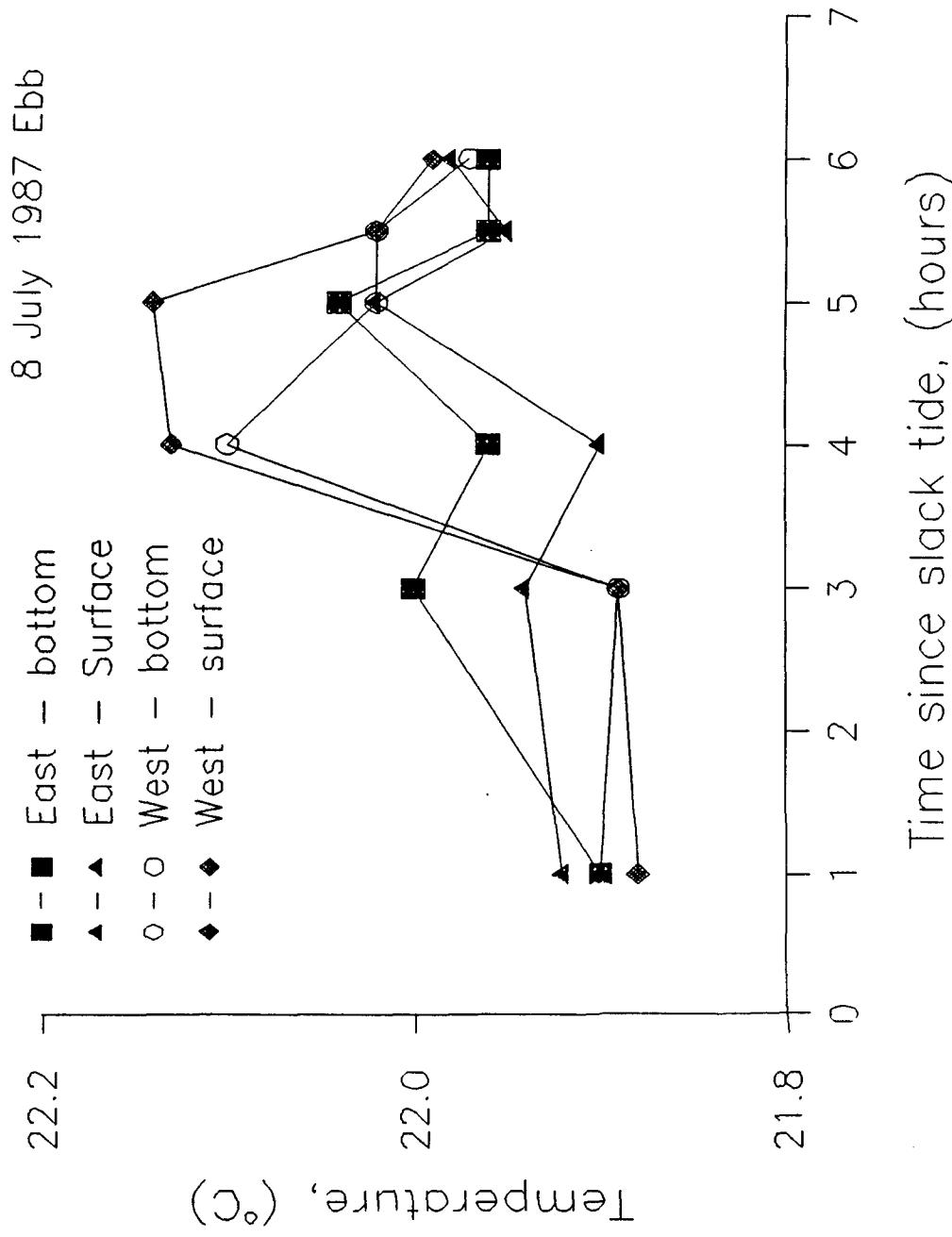


Figure 6. Comparisons of salinity vs. time for East and West sampling locations during the ebb tide of 8 July 1987.

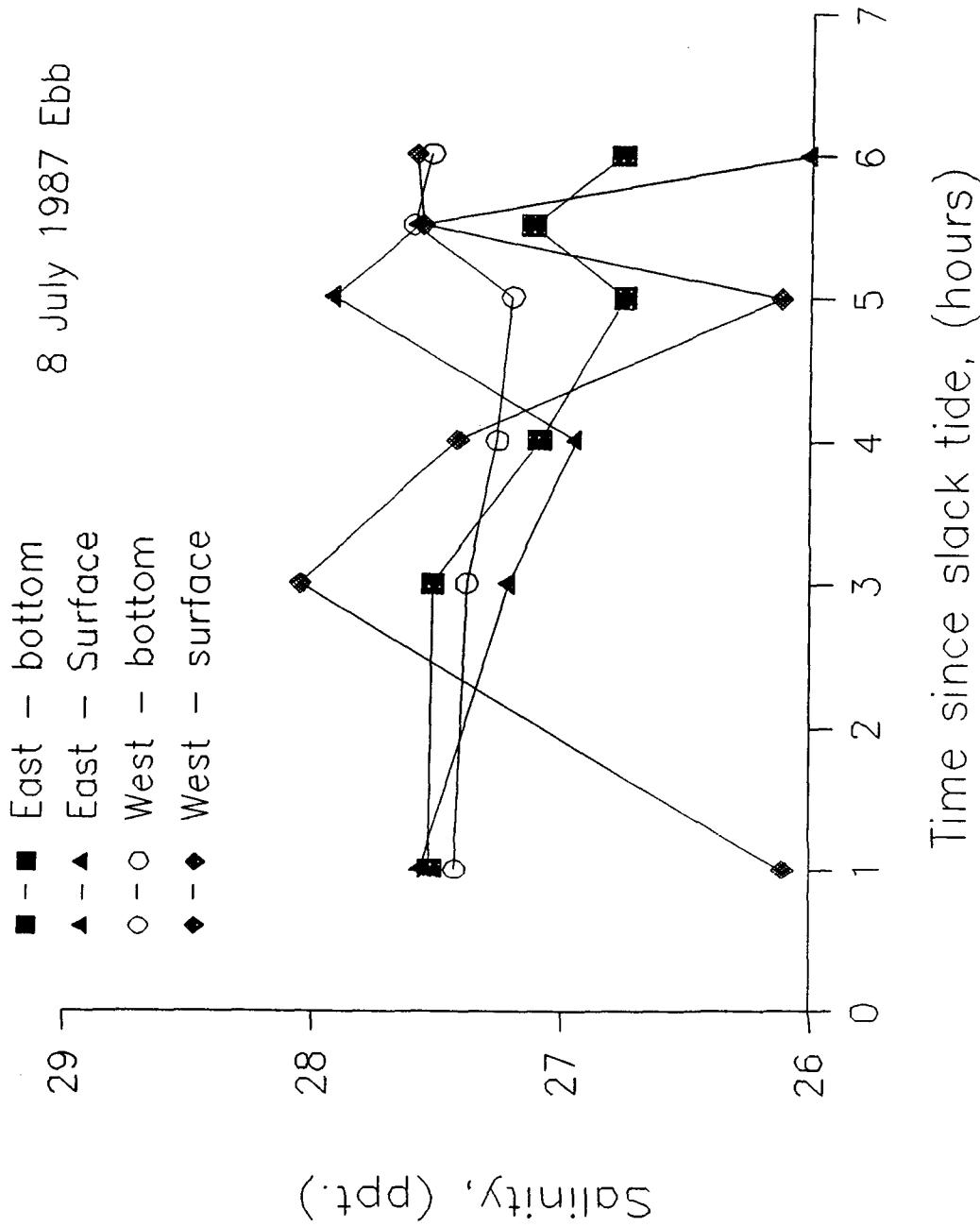


Figure 7. Comparisons of salinity vs. time for East and West sampling locations during the flood tide of 8 July 1987.

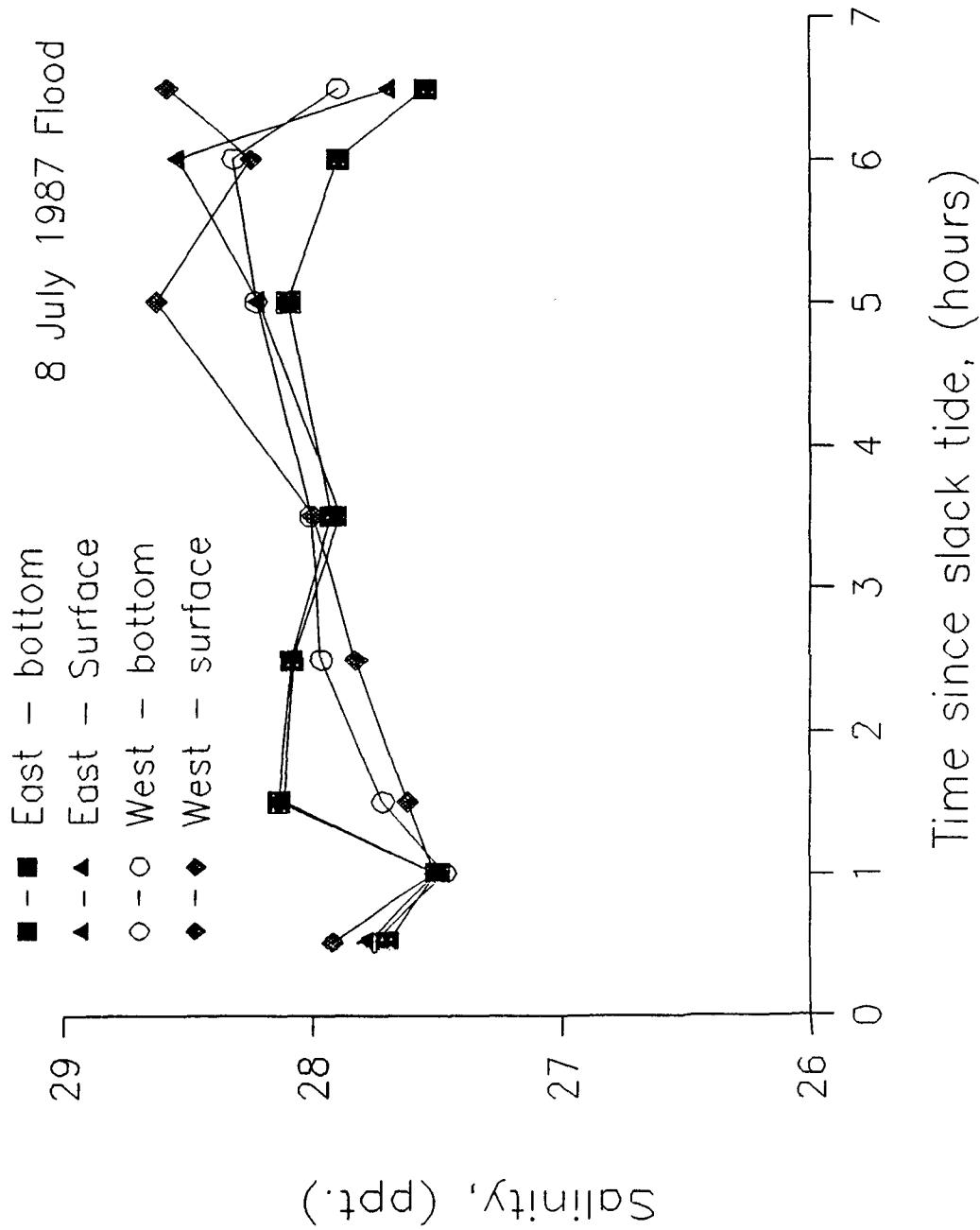


Figure 8. Water depth in the Coggeshall St. bridge channel vs. time on 9 July 1987 (870709).

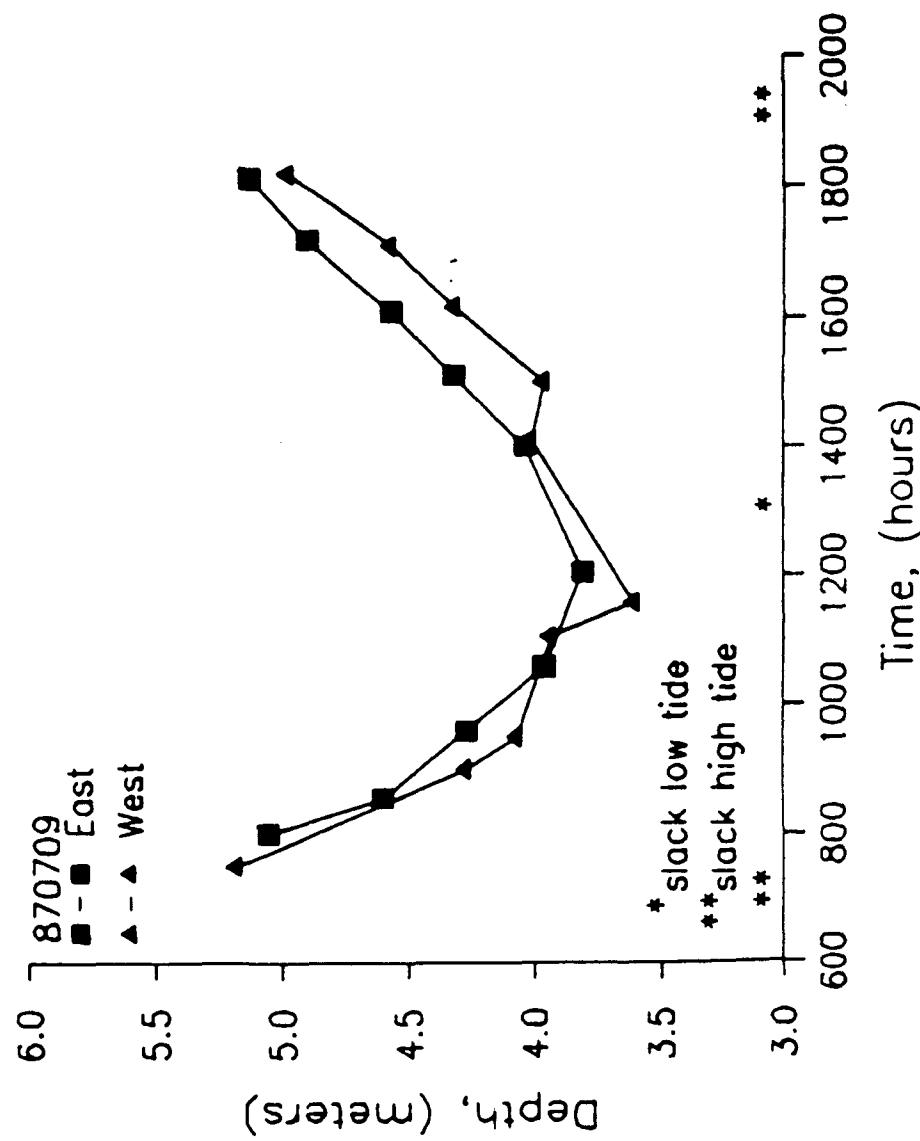


Figure 9. Profiles of current speed vs. depth for each of the 5 sampling periods on the flood tide of 9 July 1987 (870709).

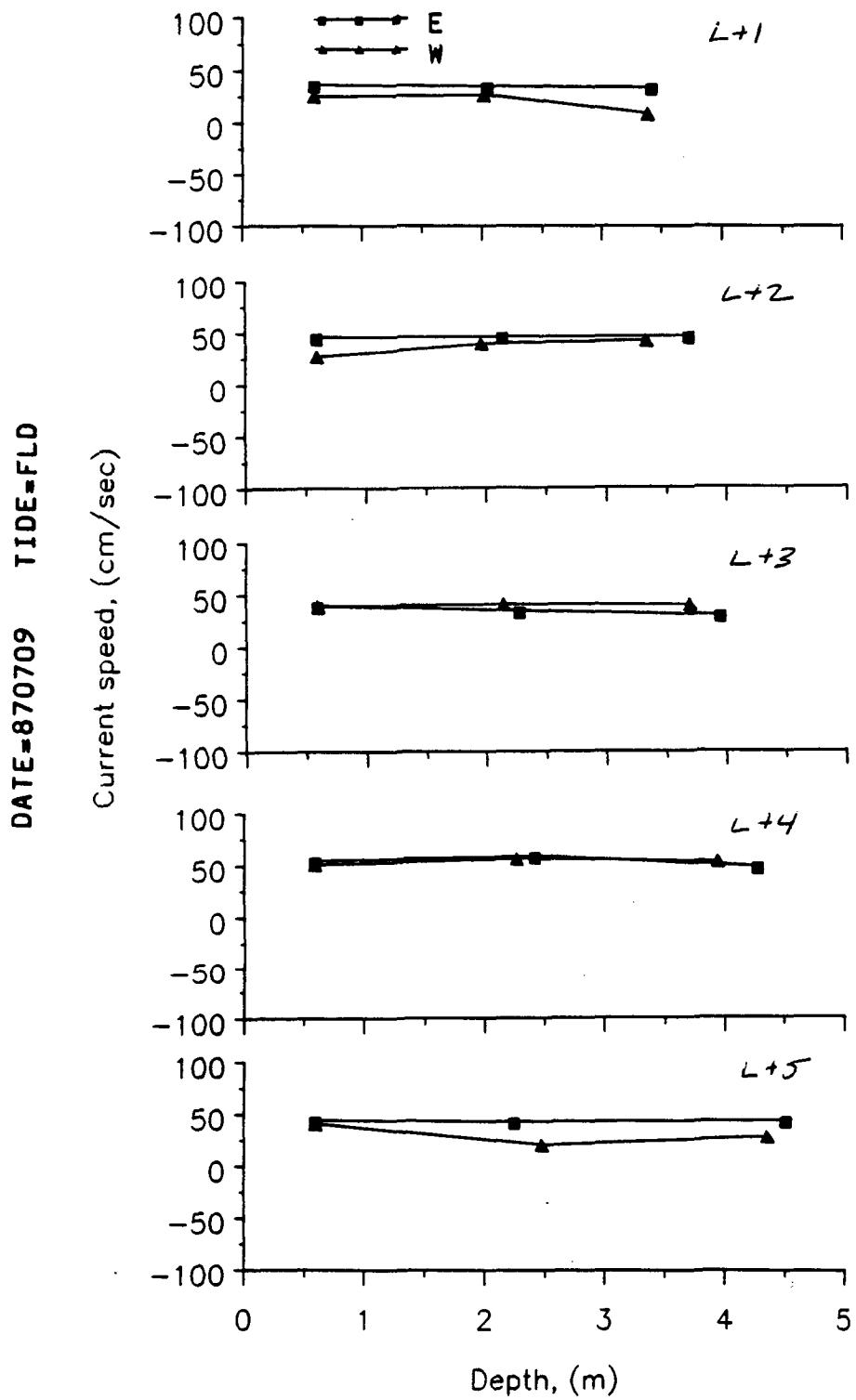


Figure 10. Profiles of current speed vs. depth for each of the 5 sampling periods on the ebb tide of 9 July 1987 (870709).

DATE=870709 TIDE=EBB

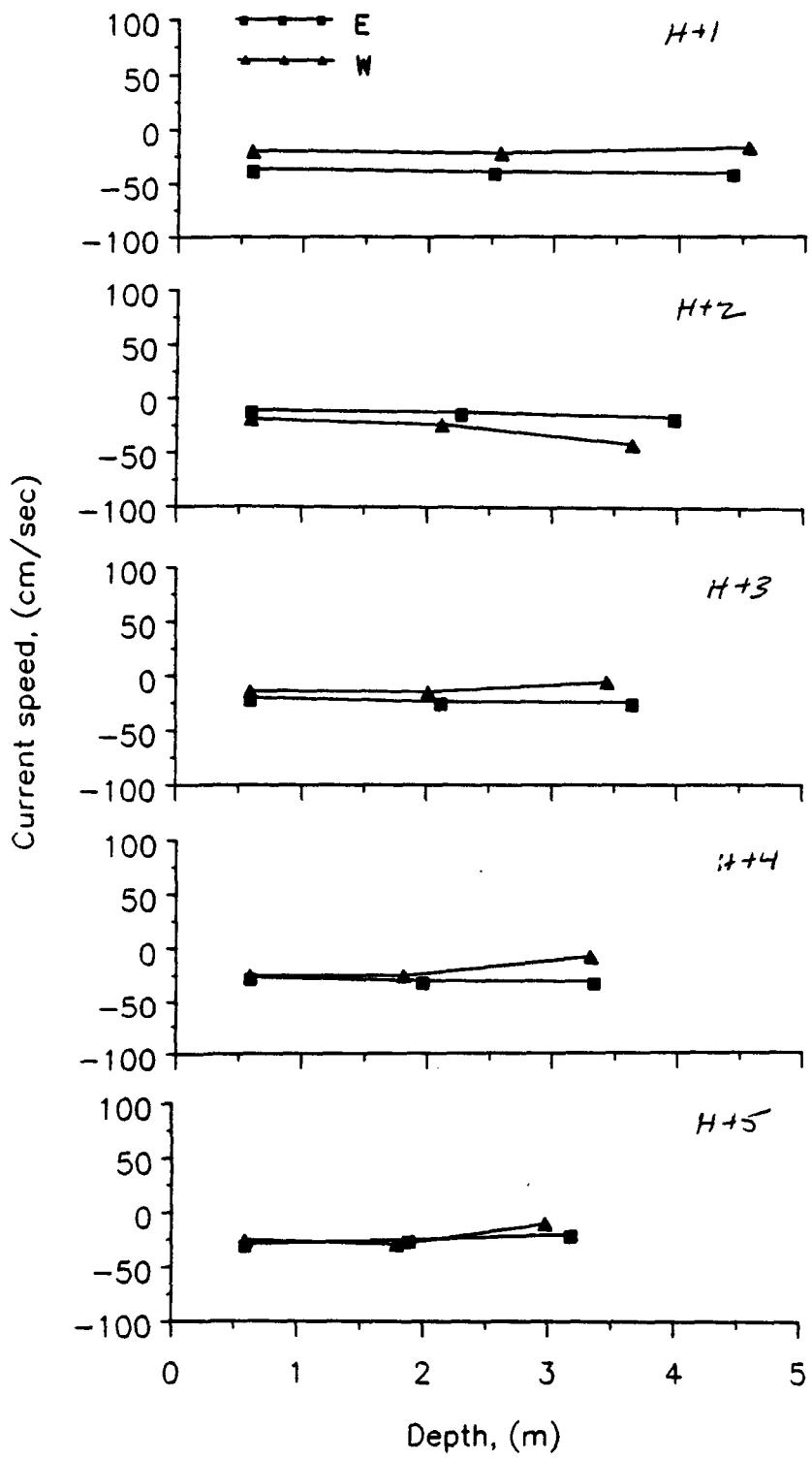


Figure 11. Profiles of temperature vs. depth for each of the 5 sampling periods on the ebb tide of 9 July 1987 (870709).

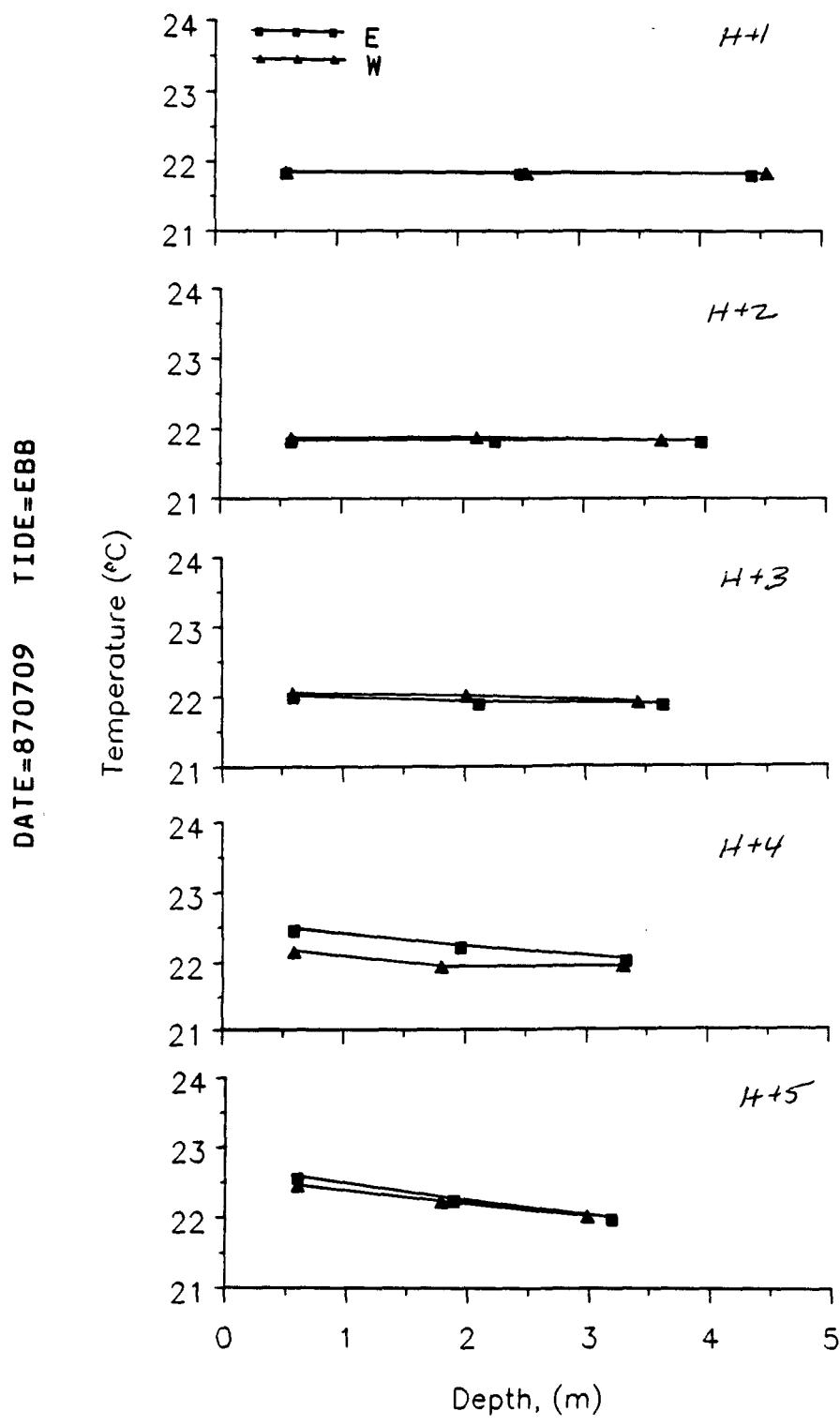


Figure 12. Profiles of temperature vs. depth for each of the 5 sampling periods on the flood tide of 9 July 1987 (870709).

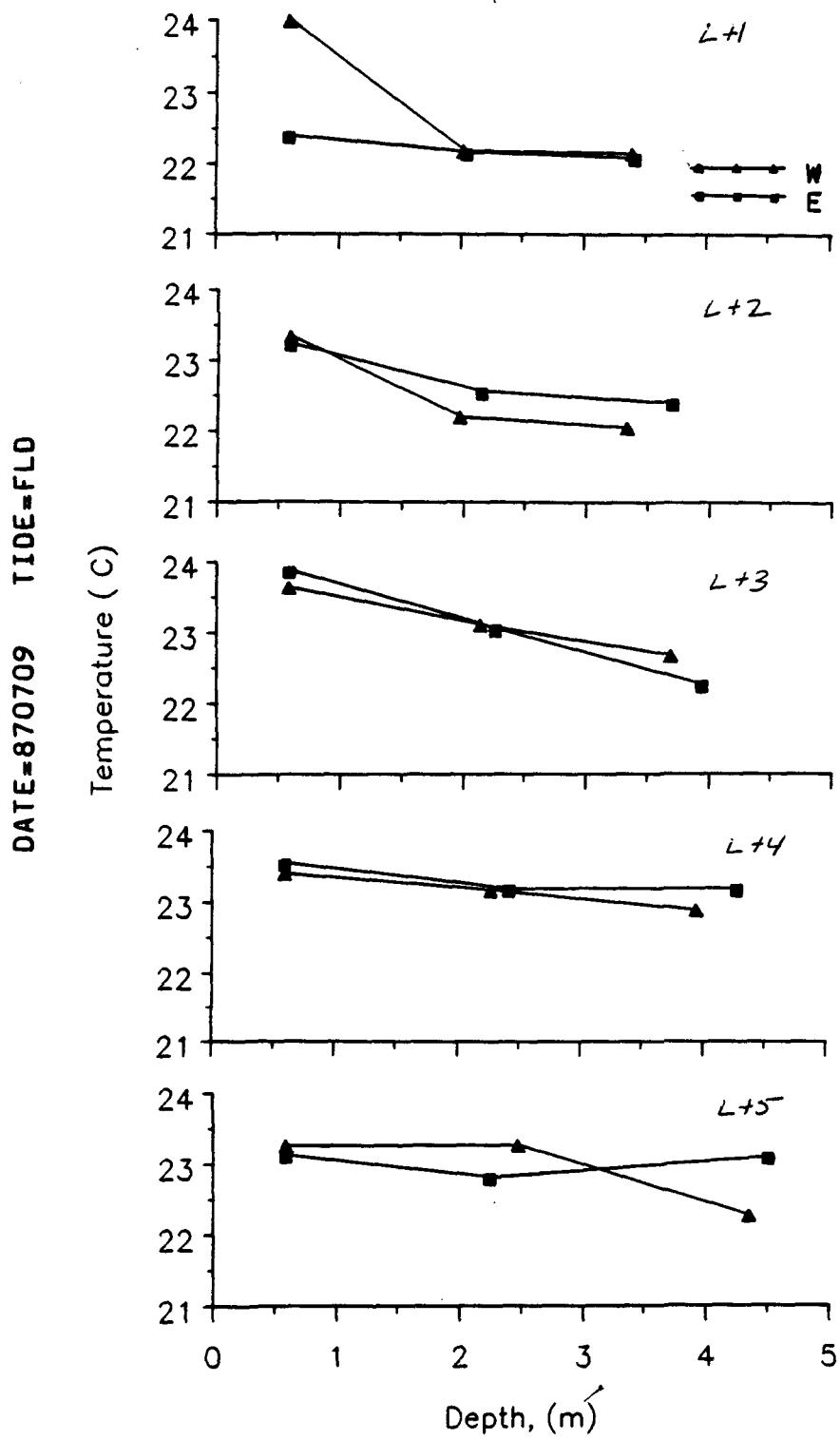


Figure 13. Profiles of salinity vs. depth for each of the 5 sampling periods on the flood tide of 9 July 1987 (870709).

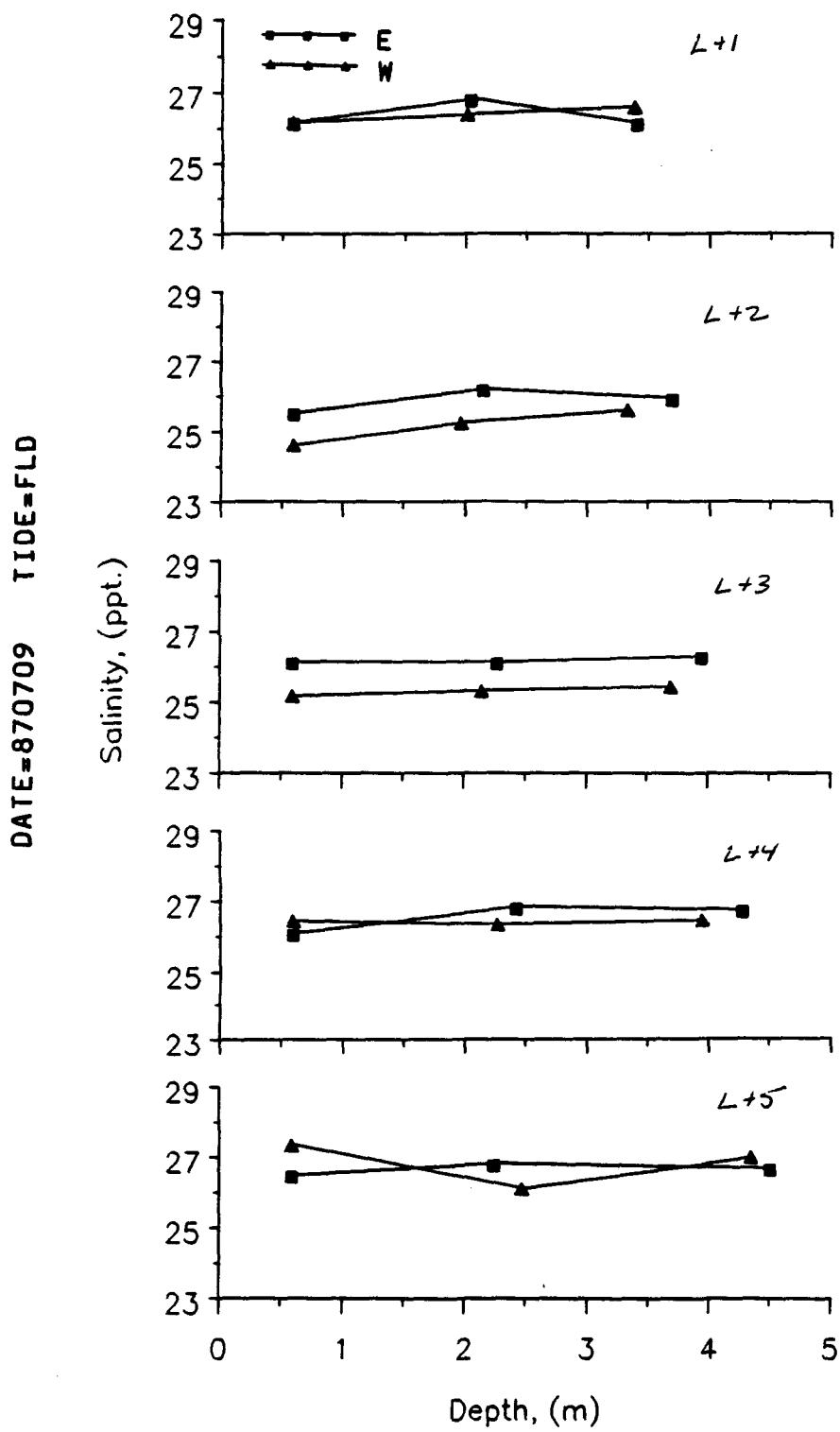


Figure 14. Profiles of salinity vs. depth for each of the 5 sampling periods on the ebb tide of 9 July 1987 (870709).

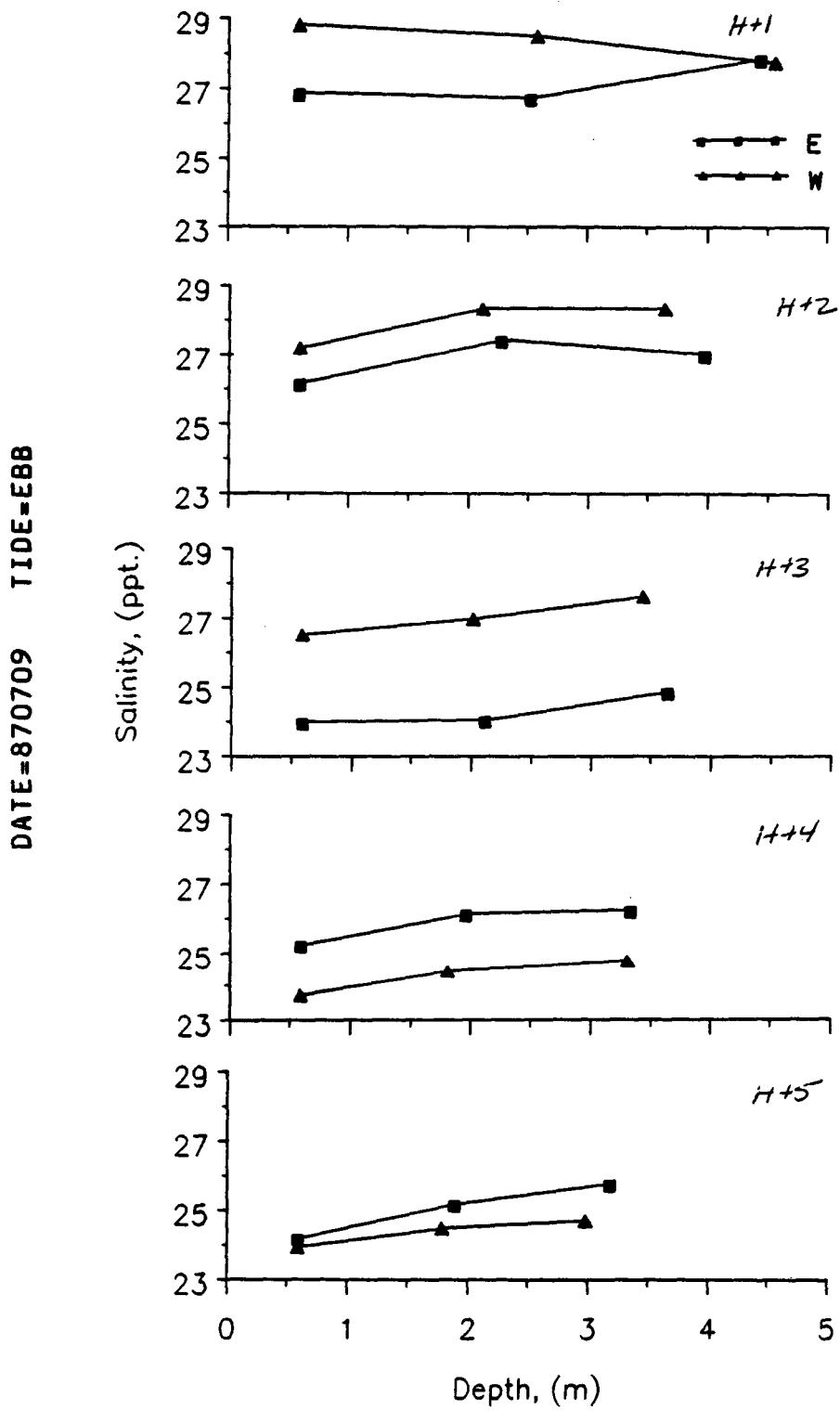


Figure 15. Water depth in the Coggeshall St. bridge channel vs. time on 13 July 1987 (870713).

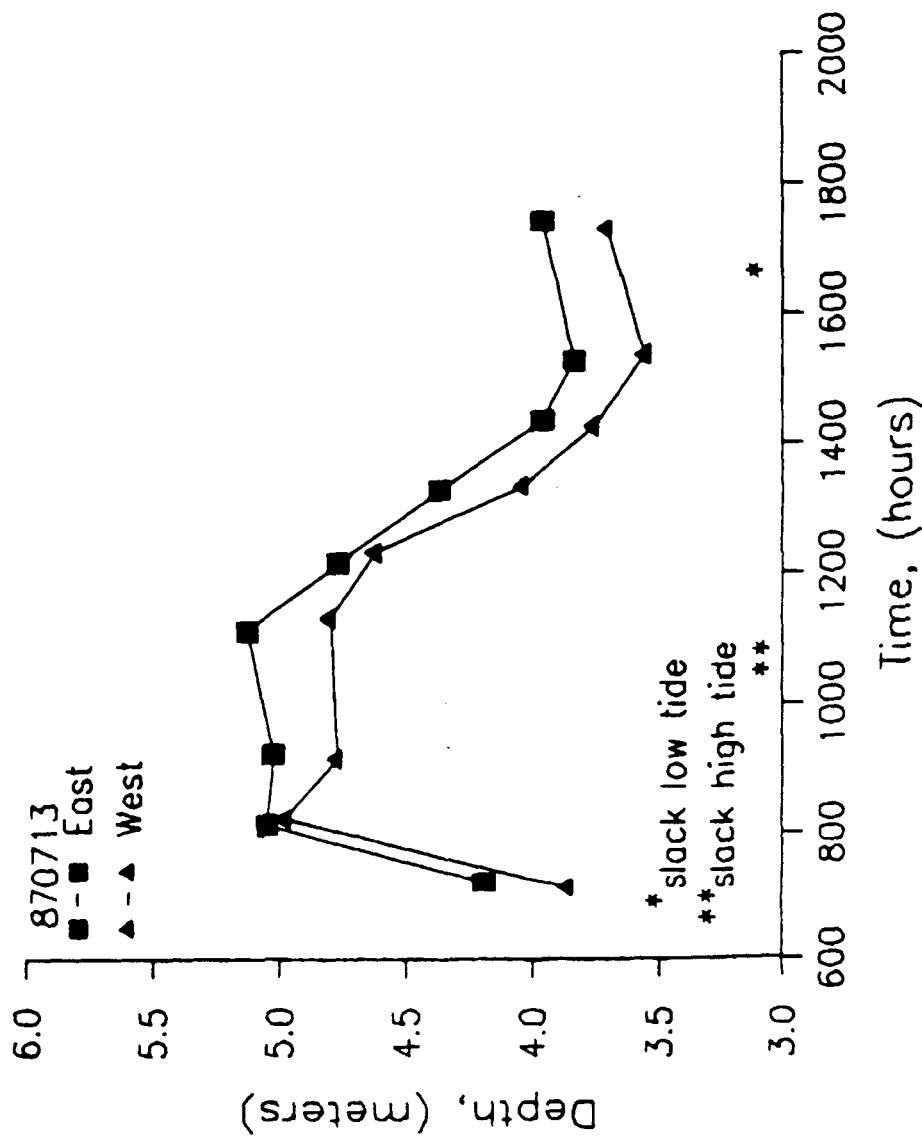


Figure 16. Profiles of current speed vs. depth for each of the 5 sampling periods on the flood tide of 13 July 1987 (870913).

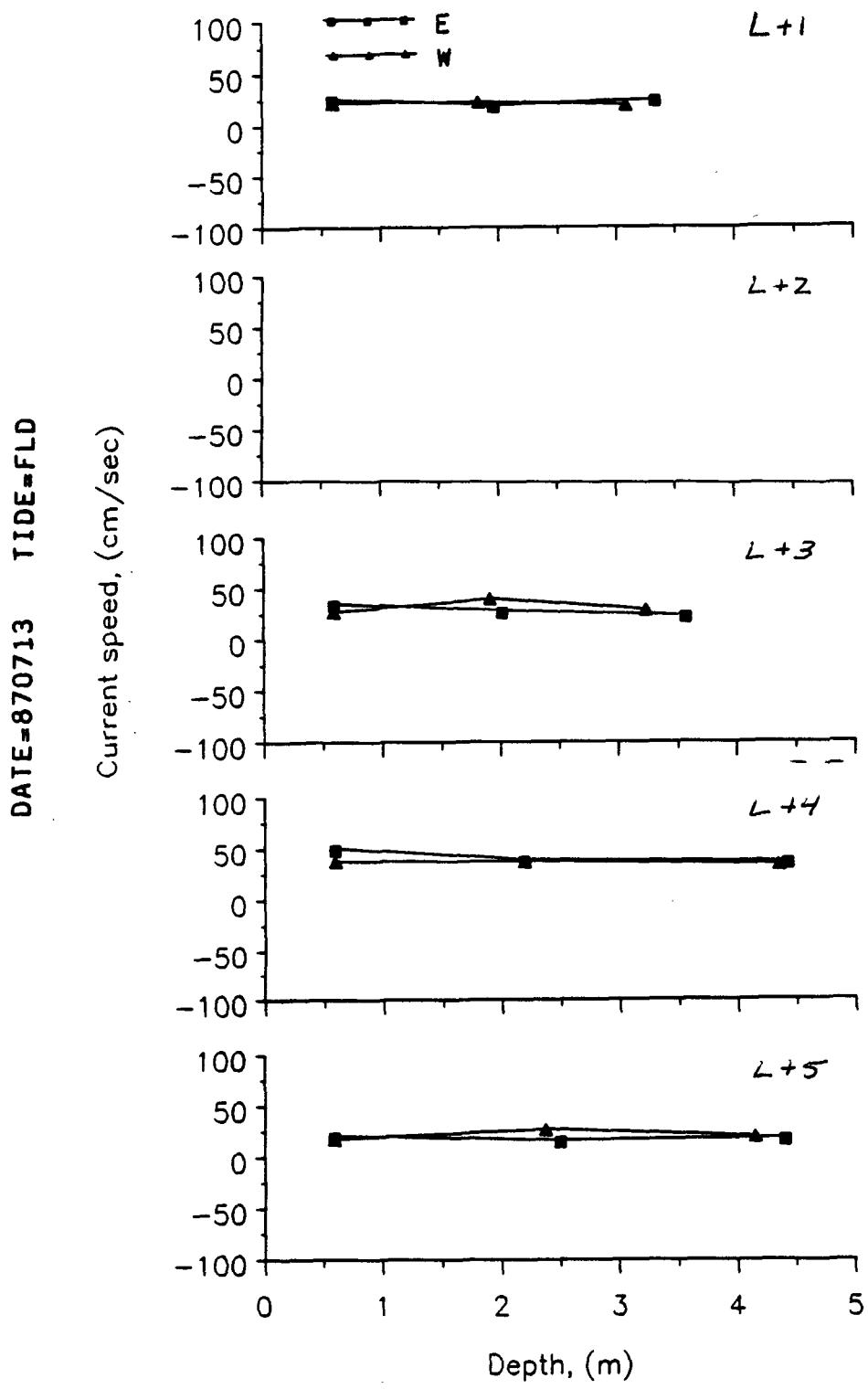


Figure 17. Profiles of current speed vs. depth for each of the 5 sampling periods on the ebb tide of 13 July 1987 (870913).

DATE=870713 TIDE=EBB

Current speed, (cm/sec)

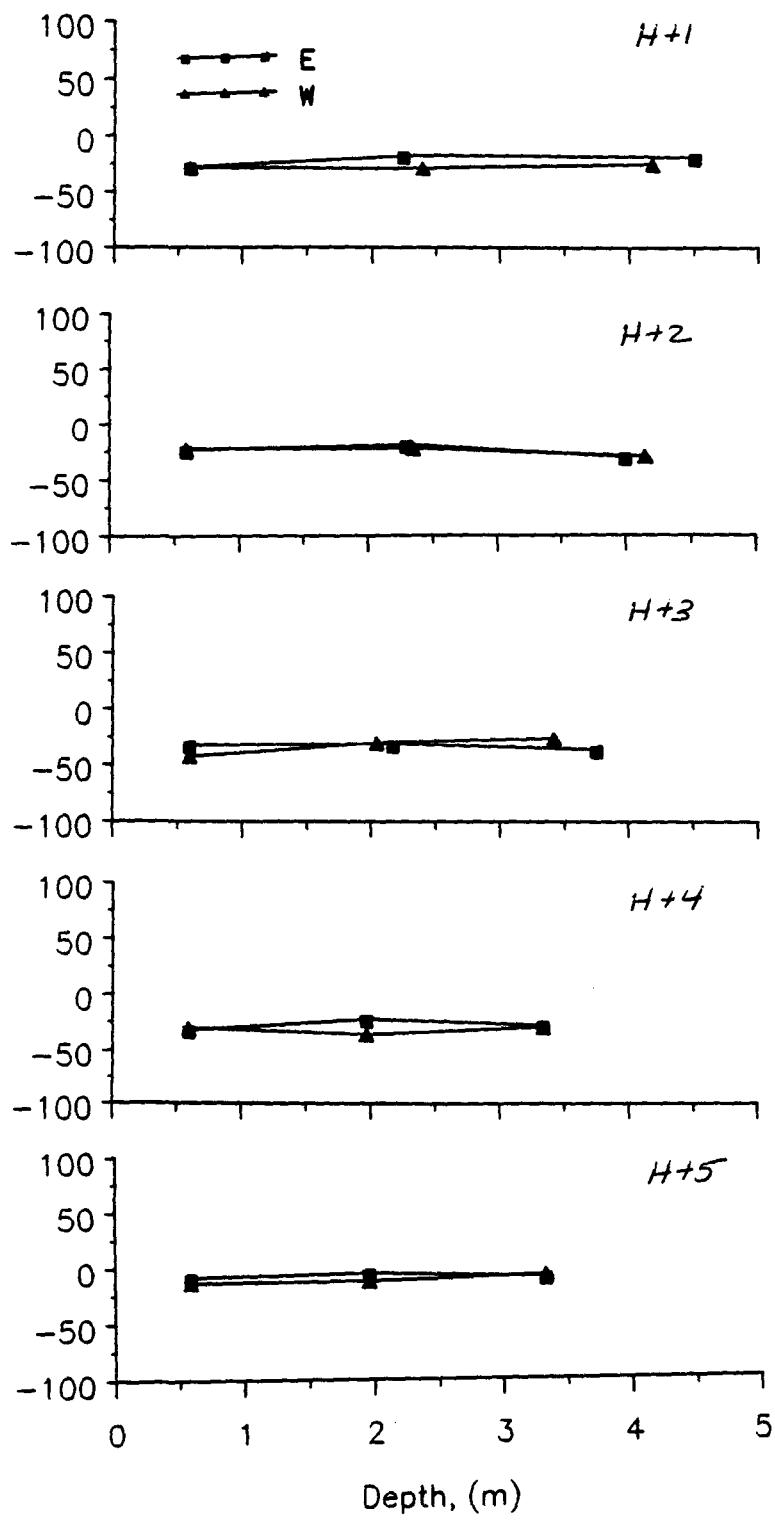


Figure 18. Profiles of temperature vs. depth for each of the 5 sampling periods on the flood tide of 13 July 1987 (870913).

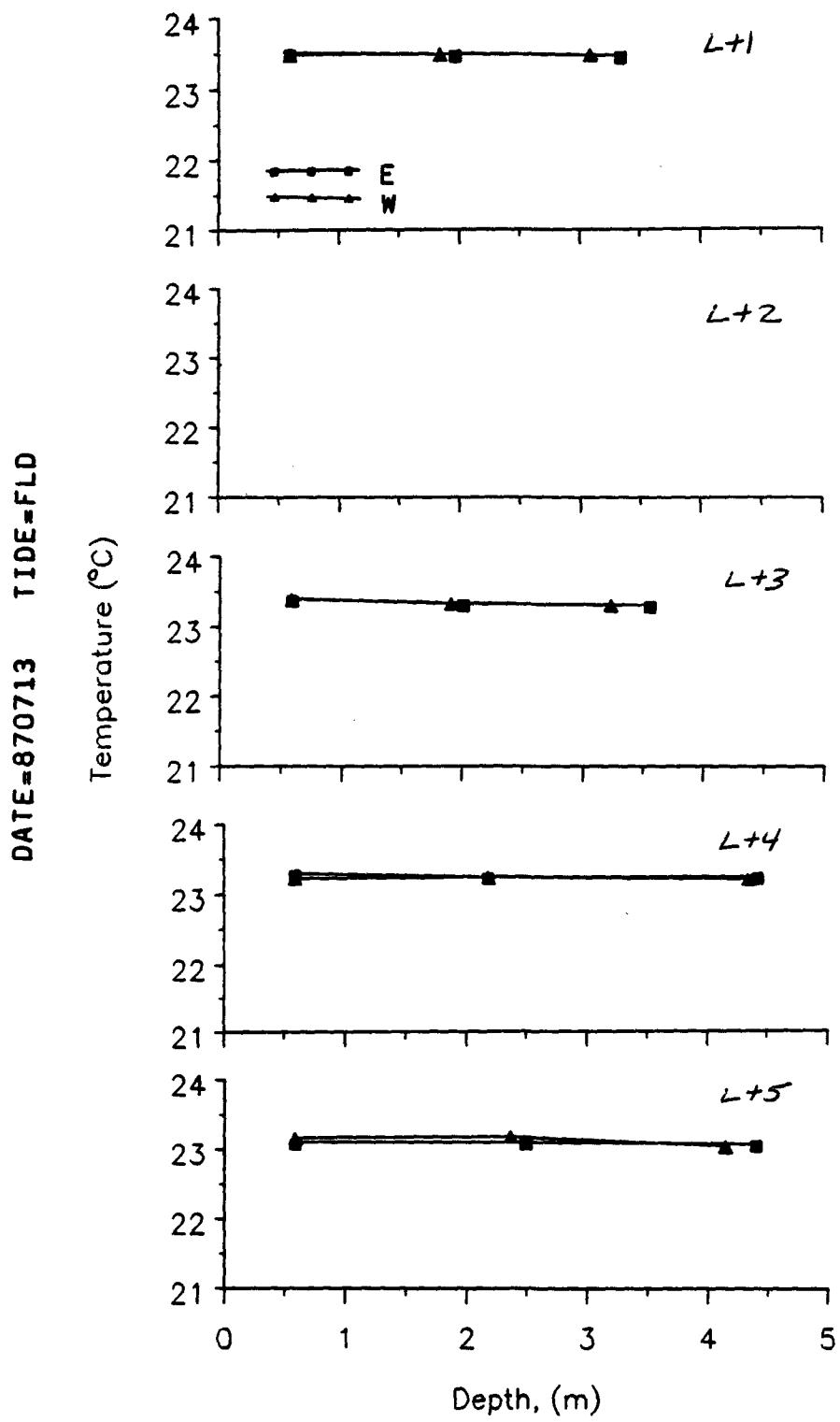


Figure 19. Profiles of temperature vs. depth for each of the 5 sampling periods on the ebb tide of 13 July 1987 (870913).

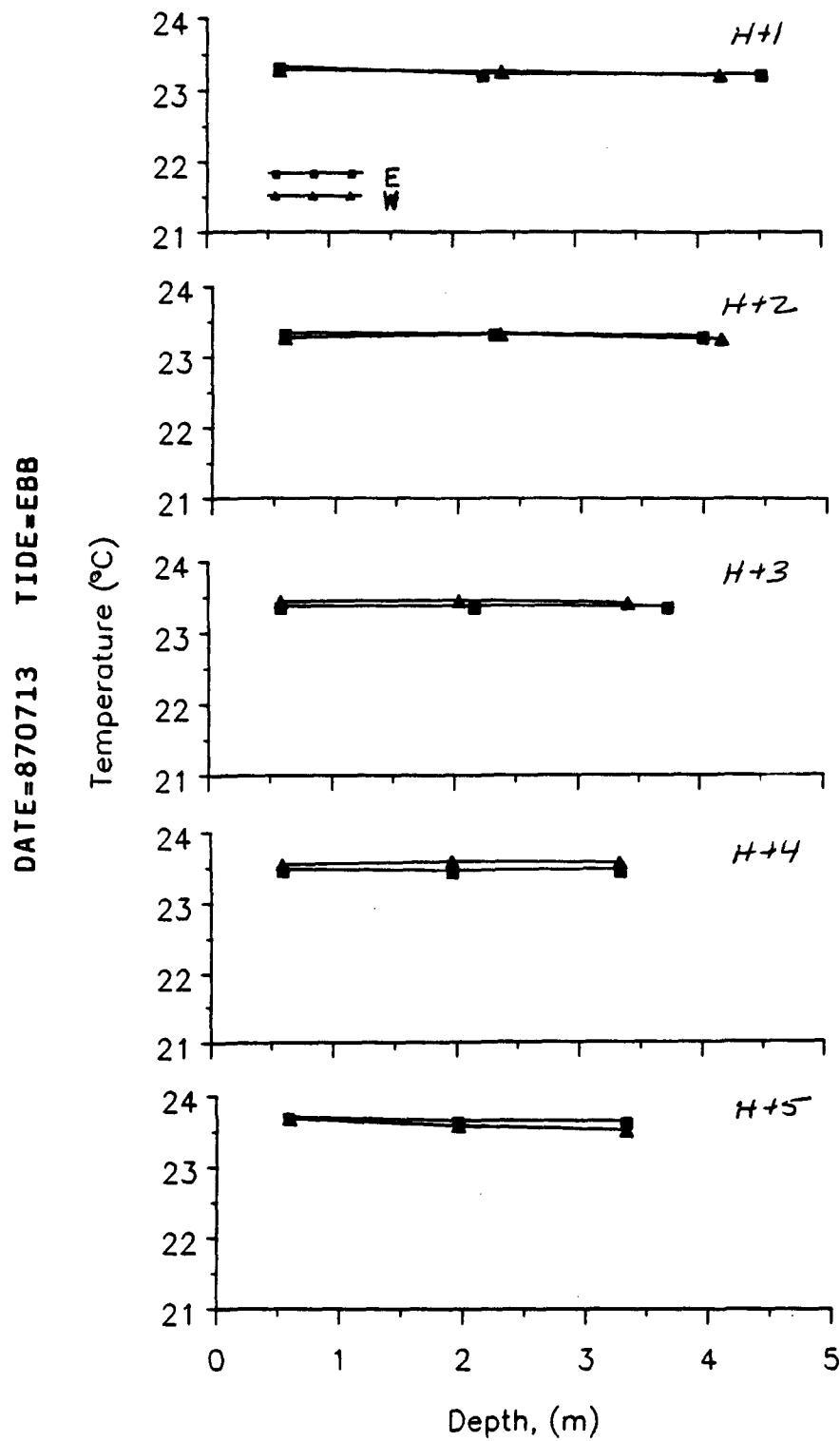


Figure 20. Profiles of salinity vs. depth for each of the 5 sampling periods on the flood tide of 13 July 1987 (870913).

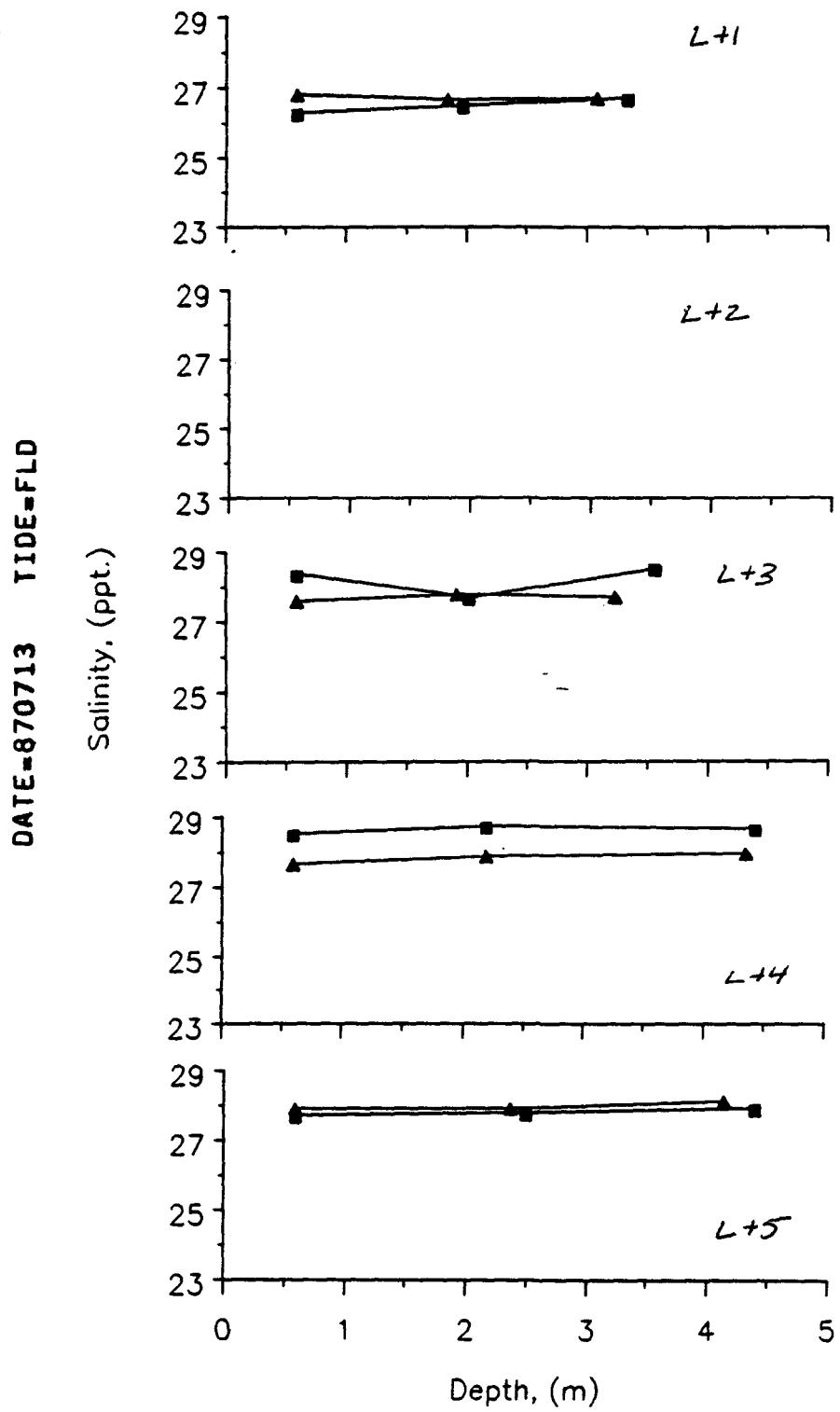


Figure 21. Profiles of salinity vs. depth for each of the 5 sampling periods on the ebb tide of 13 July 1987 (870913).

